Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ON THE GENUS CHLAMYDOPHORUS.

BY DANIEL D. SLADE.

THE Chlamydophoridæ of the group Loricata in the order of the Edentata comprises two species: *C. truncatus* and *C. retusus.* Chlamydophoridæ—Dorsal disk divided into a dorsal and a pelvic shield; pelvic shield agglutinated to the pelvis; feet strong; toes united; claws large. *C. truncatus*—Dorsal shield only attached by the middle of the back, which is covered with hair on the sides. *C. retusus*—Dorsal shield attached to the skin of the back to the edges. Both are extremely rare, and present very singular osteological modifications. The recent arrival of a mounted skeleton of the Pichiciego, *C. truncatus,* at the Museum of Comparative Zoology, in Cambridge, has induced me to bring together the few facts which constitute our present knowledge of these interesting Edentates. It is now about sixty-five years since the first description of *C. truncatus* was given by Dr. Harlan, of Philadelphia, and published in the New York *Lyceum of Natural History.* In 1828 the result of the investigations of Mr. Yarrell upon a second specimen received in England was published in the London *Zoological Journal.* But strange to say, neither he nor Dr. Harlan had recognized the bony shield and its relation to the pelvis, which constitutes its unique character among living mammals,—an oversight which may be explained by the anxiety to preserve intact the skin with its coat of mail, to accomplish which it was thought necessary to sever the bony processes by which the shield is connected with the pelvis. In 1855 a full descriptive monograph upon the *C. truncatus* was published by Prof. Hyrtl, of Vienna, in which full justice was done to its anatomy. In 1857 a short publication on the structure of the pelvis of the *C. truncatus* was made by Dr. J. E. Gray, of England; and in 1870 an interesting paper was read by Mr. Edward Atkinson, "On Some Points of Osteology of the Pichiciego," before the British Association, at Liverpool. In 1880 some interesting notes by E. W. White were published in the Proceedings of the Zoological Society. Since this, I find scarcely an observation or allusion to the subject.

Apart from its remarkable conformation, a certain interest attaches to the animal under consideration, due to its singular scarcity. There are but few specimens in the museums of the world. In Europe twelve to twenty only are known, and in our own country there are not more than six or eight, for some of which fabulous prices have been paid. The Pichiciego's sole habitat is in the neighborhood of Mendoza, in the interior of Chili, South America, at the base of the Andes, a country well noted for its terrible earthquakes. Our knowledge of its habits is very limited It is nocturnal; it passes most of the time in the sand-burrows which it makes; is extremely timid; is rarely seen, and very rarely captured, except when accidentally discovered nestled within the blankets of Indians who are sleeping upon the ground. Its food is said to be chiefly that of worms, and in this respect, as much as in its general subterranean habits, it resembles the European mole.

The entire external surface of the body is covered with a fine, white, silken hair, more delicate even than that of the mole. Over this is a shield, cloak, or covering, composed of a series of plates of a texture which resembles thin sole leather, covering the superior portions of the cranium, and extending half round the body for its entire length. This "coat of mail" is made up of twenty-four cross-series of quadrangular plates, counting from the vertex, the posterior edges of each row covering the anterior of the one immediately succeeding. The posterior truncation, formed by a sudden curving of the shield at a right angle to the body, is also composed of plates similar to those upon the back, but disposed in half circular rows, of which there are five. The lower margin of this surface at about its center presents a notch, beneath which passes the caudal extremity, also protected by plates. The semicircular margin of the truncated portion, as well as the lateral margins of the shield, are fringed with the same silken hair, that of the exterior ring of the truncated portion forming a double, somewhat bristly ridge, standing out at right angles.

Upon the cranium the dermal plates descend from the vertex to the snout in gradually narrowing series, being attached to the frontal protuberances, of which I shall presently speak. The extent of its attachment to the dorsal shield in the middle of the back varies; it would seem to be connected to the spinal metapophyses by a loose cuticular tissue, and posteriorily more intimately to the osseous pelvic shield beneath.

There is no distinct pinna,—only a slight elevation of cartilage at the external meatus. The small, entirely black eye is scarcely visible, deeply covered as it is by the intermingling of the hairy fringe and mantle. The mammæ are pectoral, two in number. The testes are abdominal. The entire length of the skeleton from the tip of the snout to the pelvic shield varies very slightly from five inches.

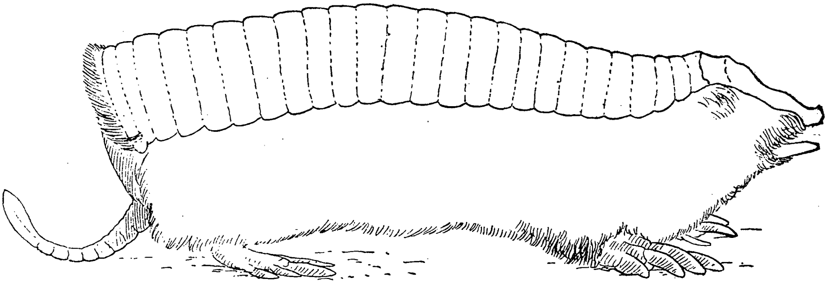

FIG. 1.—*Chlamydophorus truncatus* Harl.; two-thirds natural size.

The cervical region of the vertebral column presents the usual anchylosed condition of the centra of the second, third, and fourth vertebræ, with the rudimentary development of the arches and neural spines, commonly found in the Dasypodidæ. The metapophyses of the two last dorsal and three first lumbar vertebræ are elongated for the attachment of the dermal coat. The sacral vertebræ are uniform in number and arrangement with the corresponding bones of *Dasypus unicinctus*, but in the conformation of the pelvis, as shown in the wide separation of the pubes and the growing together of the tuberosites of the ischium, whence is produced the "sphœroma ischii," that "verum prodigium osteologicum" of Professor Hyrtl, there is a wide difference. For the proper understanding of the conformation of this singular pelvic shield the specimen should be before one. Without this aid, and even with the assistance of drawings, the admirable description of Professor Hyrtl can with difficulty be comprehended. But I have no better resource than to translate his words: "Three longitudinal crests spring up from the dorsum of the sacrum, of which the middle one absorbs, as it were, the two lateral, at a point just behind the ischiatic foramen; thus only one remains. This, in the shape of a long, perpendicular, thin, pellucid plate, perforated in many places, is produced throughout the entire length of the sacrum, and posteriorly is lost in the sphœroma. The middle crest at the spot where the meeting of the lateral ones produces a bony mass is transformed into a bony transverse plate, which is connected on either margin with a long and unusual process of the ischium, which I call the ascending. From the dorsal face of the transverse lamina two round, bony columns rise and become supports to the sphœroma. Thus this wonderful sphœroma is connected to the pelvis by five fulcra. The two first and principal ones arise from the ischia, the two middle are the two columns erected on the transverse lamina of the sacral crest, and the highest is the termination of the median crest."

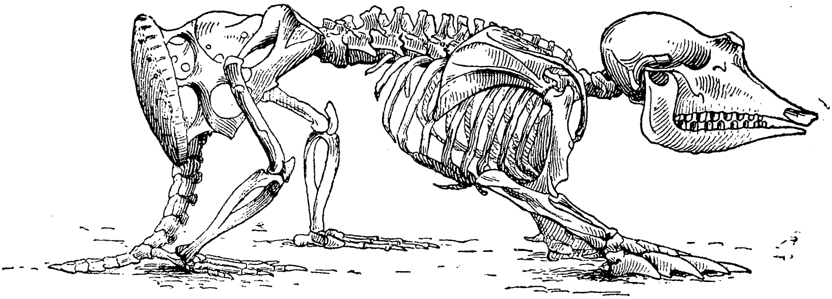

FIG. 2.—*Chlamydophorus truncatus* Harl.; two-thirds natural size; skeleton.

Since the strongest fulcra of the shield are found in the place where in other Dasypodidæ the tubera ischii reside, it would seem evident that this unusual structure springs from the confluence of the tuberosites. Its shape is that of a semi-circular disc, with its convex margin upwards, which is thicker than the lower margin. It is vertical in position, and the smooth posterior surface is ornamented with semi-circular rows of foramina and fissures "which give insertion to the short, tough fibres by which the dermal coat is bound to the shield throughout." According to the dissection of Mr. Atkinson, the sphœroma is completely invested on *both* its surfaces by the common integument of the body, so that the anterior concavity and the bony fulcra inplanted into it are clothed with hairy skin, reflected from the back, while the posterior surface is covered by the closely adherent continuation of the dermal horny coat. The caudal vertebræ are fourteen in number; the transverse processes of the eighth, ninth, tenth, and eleventh are elongated so as to produce a spatulate condition of the organ.

The cranium is conical, capacious, compressed, and without sutures. Seen in profile, owing to the elevation of the vertex, as well as to the concavity between the two singular rounded processes which are given off from the frontal and which connect with the olfactory organs, the contour of the cranium reminds one of the Indian elephant. Especially is the mandible ungulate in its character, in its depth, perpendicular ramus, rounded angle, and in the condyloid process being longer than the coronoid. From the anterior portion of the two frontal tuberosities a narrow ridge on either side converges towards the nose. The elongate nasal bones terminate at an orifice, opening downward.

The dental system is composed of eight molars on either side of both jaws. The teeth are long, cylindrical, have no true roots or crowns, are encircled by enamel, are so deeply set that those of the mandible dimple its inferior margin. They are slightly curved. The orbital and temporal fossæ are not separated. The zygomatic arch is slender posteriorly, but anteriorly it is more developed with a descending process from the malar.

The external meatus auditorius is prolonged in the form of a long, winding, cylindrical osseous tube, ascending behind the articulation of the jaws, and, arching over the roof of the zygoma terminates in an aperture just behind the eye. This osseous tube is composed of two separate pieces, which are joined by an interposed ring of cartilage. This very remarkable auditory apparatus suggests a similitude to the common ear-trumpet used by the deaf, particularly as it is capable of limited movements.

The præsternum is broad for the articulation of the first rib. It has also a sharp crest or keel upon its anterior surface, being decidedly bird-like in its character.

The scapula presents several modifications. The prescapular border is deeply notched; the posterior border of the postscapula is greatly elongated, being sickle-shaped. The dorsum has a second spine, smaller, but parallel to and beneath the true spine. The acromion is very long, passing forwards, downwards, and inwards over the head of the humerus to be articulated with the complete clavicle. The humerus, large and broad, has a prominent deltoid ridge. The epicondyles are both much produced transversely, the inner one being perforated. The radius is small; the ulna much flattened, with an olecranon process nearly as long as the shaft. The first and second digits of the manus are slender and elongated, and both have the normal number of phalanges. The other three have the metacarpal short and broad, the proximal phalanx suppressed, the middle very short, and the ungual phalanges enormously developed, that of the third being the longest.

The femur is large and strong, with a well-developed third trochanter. The tibia and fibula are firmly anchylosed at each extremity, and arched in opposite directions. The os calcis is elongated backwards and flattened. The pes is normal in type, and presents no modifications. Both manus and pes are plantigrade.

The following abstracts are from the notes on *C. truncatus* by E. W. White, F.Z.S., London, published in the Transactions:

"I was induced in August, 1879, to undertake a ride of forty leagues from Mendoza, and a diligent search for six days, in company with a large number of men, in order to obtain a better knowledge of its habits. I was fortunate enough to secure one living specimen of *C. truncatus*, which, in spite of the utmost attention, survived capture only three days; in fact, no instance has occurred of a longer survival in captivity than eight days.

"The usual drawings of this animal in zoological works are erroneous in more than one particular.

"1st. The tail is represented as flexible, and terminating in a somewhat flattened, though, on the whole, solid, pointed paddle, whereas it is almost perfectly inflexible, the paddle at the extremity being completely flattened and rounded at the vertex.

"2d. The fringe issuing from the ultimate and large ring of the dorsal carapace, instead of being drooping, as often depicted, where it unites with that of the exterior ring of the truncated extremity, forms a double, somewhat bristly fringe, standing out well at right angles to that truncated extremity.

"3d. The lateral edges of the dorsal chitinous shield are sharply serrated, instead of forming a continuous wave-line.

"4th. The eye, instead of being distinctly visible, is rudimentary and hidden by the fringe and mantle.

"5th. The projection of the slightly convex truncated extremity is very exactly a section of a circle, the center of which is a point whence issues the tail, the whole of this truncated armor plate forming a very hard, solid, bone-like structure, which at once suggests the use to which it is devoted,—viz., to act as a rammer to consolidate the sand and to fill up the entrance to its burrow, from the inside, and thus prevent the ingress of its enemies.

"6th. When walking, the *C. truncatus* plants both fore and hind feet on the soles, and not on the contracted claws, as is the case with the ant-eater, carrying its inflexible tail, which it has no power to raise, trailing along the ground and inclined downwards from the body. As it commences to excavate, the fore feet are first employed, and immediately afterwards, supporting its body on the tripod formed of these and of the extremity of the tail, both hind feet are set to work simultaneously, discharging the sand with incredible swiftness. Although analogy and form would seem to indicate it, I never could detect the tail aiding in the operation of excavation; in fact, its inflexibility precludes this idea. The only use of the flattened extremity appears to me to be to furnish it with a more secure point of support in the shifting sands.

"Sluggish in all its movements, except as a fodient, in which capacity it perhaps excels all burrowing animals, the *C. truncatus* performs the operation of excavation with such celerity that a man has scarcely time to dismount from his horse before the creature has buried himself to the depth of his own body. The tunnel scooped out, of the exact size of the truncated extremity, presents three ways of exit.

"The light, fine sand in which it burrows proclaims unmistakably its presence by the tracks left. Besides the impressions of the four feet, the inclined, stiff tail leaves its deep, central, indented line. If the tracks were numerous the animal would no longer be rare, but it is a fact that a year or more sometimes elapses without any trace of its existence. Occasionally specimens have been unhoused by the plow. I could not succeed in discovering the nature of the food from the solitary live specimen which I obtained, but I fed it on milk, which it lapped like a cat.

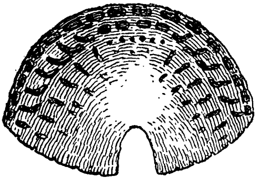

FIG. 3.—*Chlamydophorus truncatus* Harl. Pelvic shield from behind; two-thirds natural size.

"This delicate little animal is extremely susceptible to cold. My living example, after passing a night in a box of earth covered with flannels, was found the following morning in a very exhausted condition. Wrapped in warm clothing, and placed near the fire, it soon revived. Its normal paradise seems to be when the temperature of its residence is such as is produced by sand so hot as almost to scorch the hand. During the summer it leaves its burrow at dusk to search for food, and, being truly nocturnal, moonlight nights are very favorable for discovering it."

Mr. White thinks that the use of the fringe surrounding the shield is solely to prevent the introduction of sand beneath it during excavation.

The only description of *Chamydophorus retusus* is in the short monograph by Dr. Hermann Burmeister, Director of the Museum of Buenos Ayres.[1] This museum contained in 1863 the only specimen then known. The animal is a native of Bolivia, and its habitat the neighborhood of Santa Cruz. No one of the natives, says Dr. Burmeister, had ever seen the animal, until they were shown the one captured by St. Martin at Pari, Santa Cruz. They were aware that there was an animal which lived underground, and to which they gave the name of Lloron, meaning a new-born infant, from the peculiar cries it made. Dr. Burmeister gives an amusing account of its capture, and the celerity with which it threw out the sand, supported by the hinder parts in its effort to escape by burrowing.

---

[1] Abhandlungen der Naturforschenden Gesellschaft zu Halle, 1863.

C. retusus is larger than *C. truncatus*, and has one or two bristles on the hinder edge of the dorsal shield, with many bristles on the lower edge of the lateral portions. The upper part of the pelvic shield has pencils of bristles. There is a well-developed pinna.

RECORD OF AMERICAN ZOOLOGY.

BY J. S. KINGSLEY.

(Continued from Vol. XXV., page 355.)

LEPIDOPTERA.

SMITH, J. B.—Contribution toward a monograph of the insects of the Lepidopterous family Noctuidæ of temperate North America.—Revision of the species of the genus Agrotis. Bull. U. S. Nat. Mus., No. 38, 1890.—An exhaustive paper of 231 pages. *Vide* AM. NAT., XXIV., p. 1090, 1890.

FERNALD, H. T.—External markings of Pupæ. *Zool. Anz.*, XIII., p. 47, 1890.—Reference to literature.

KELLICOTT, D. S.—Our injurious Ægerians. AM. NAT., XXIII., p. 1106, 1889 (1890).

SMITH, W. W.—*Carpocapsa pomonella* in New Zealand. *Ent. Mo. Mag.*, XXVI., p. 218, 1890.

BEHR, H. H.—Double broods of *Argynnis calippe*. *Zoe.*, p, 211, 1890.

PACKARD, A. S.—The life-history of *Drepana arcuata*, with remarks on certain structural features of the larva, and on the supposed dimorphism of *Drepana arcuata* and *Dryopteris rosea*. Proc. Bost. Soc. N. H., XXIV., p. 483, 1890.

——Hints on the evolution of the bristles, spines, and tubercles of certain caterpillars, apparently resulting from a change from